

# Anterior cutaneous nerve entrapment syndrome : epidemiology and surgical management

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# Chapter 10

Valorisation



# 10

## Introduction

The anterior cutaneous nerve entrapment syndrome is a frequently overlooked, and to many physicians, a largely unknown entity<sup>1-3</sup>. Over the last century, just a handful of physicians have reported on a limited number of aspects of this painful syndrome<sup>3-11</sup>. Most contributions focused on clinical presentation, diagnosis and basic treatment options. Although these papers undoubtedly had educational value, they did not lead to a permanently increased awareness among physicians. The present work highlights the ACNES incidence and prevalence in certain populations, and the socio-economic impact of a disease that causes pain. The cost due to medical consumption and loss of productivity as a consequence of having an unrecognised disease are investigated. The most important aspect of it all is to 'increase awareness' among general practitioners as well as a wide variety of medical specialists such as internists, gastroenterologists, emergency physicians, gynaecologists, urologists and paediatricians. We therefore chose to not only publish our work in surgical journals but also in journals for general practitioners, gastroenterologists and emergency medicine physicians. Our work was also presented on several national and international meetings of different specialties. Furthermore, information appeared in national newspapers and TV media over the last years whereas a website was launched containing information for both patient and doctor ([www.buikpijn.nl](http://www.buikpijn.nl)).

### Socio-economic relevance

As concluded in chapter 5, in the year preceding the diagnosis ACNES patients consume on average €5,400 on health care costs and have an average productivity loss of €13,800. Based on a calculated 57:100.000 ACNES incidence rate (chapter 4), costs of illness can be approximated<sup>12</sup>. When extrapolated to the Dutch population (2015, 16.900.000 inhabitants), some 9.500 new ACNES patients may be identified yearly<sup>13</sup>. On the basis of these assumptions, total yearly costs associated with ACNES in The Netherlands can be estimated at €182.4 million (€51.3 million direct medical costs and €131.1 million indirect non-medical costs), assuming that all newly diagnosed ACNES patients experience a similar burden of disease, which is not necessarily true. However, the calculated incidence rate (chapter 4) was also based on ACNES patients with severe complaints, since they all consulted an outpatient department or an emergency department for unacceptable pain<sup>12</sup>. If all these patients would undergo a diagnostic and treatment regimen as proposed

in the present thesis ( $\pm$  €2,800 on average per patient for diagnosis and treatment), direct medical costs are calculated at €26.6 million per year. An indirect non-medical cost calculation cannot reliably be determined, but a maximum half a year treatment period (including waiting time prior to first evaluation as well as time periods between treatment steps) is reasonable. Assuming similar productivity losses as calculated in this thesis, early detection and treatment would lead to an estimated yearly €80-100 million cost reduction. Thus, it can safely be concluded that earlier recognition will substantially reduce both the suffering amongst individuals as well as reduce unnecessary direct and indirect societal costs. Indeed, 'Carnett cuts costs'<sup>14</sup>.

### Relevance in the medical field

The studies in this thesis are just based on incidence and prevalence in The Netherlands. It is reasonable to assume that ACNES is also common and underdiagnosed in the rest of the world. Over the last few years we have received requests for help (e-mail consultations or personal visits) from patients and physicians from other parts of the world (USA, United Kingdom, Sweden, Greece, South Africa, Germany, Belgium, Denmark). The vast majority of patients had learned about us through the internet or through physicians who had read our publications. In these patients a provisional diagnosis of ACNES was established. A common question was whether we knew a physician or pain specialist in their respective country who was knowledgeable and willing to treat this pain entity. We discovered that the number of physicians who treat ACNES worldwide is exceedingly limited. As a result, a handful of foreign patients (i.e. US and UK) came to the SolviMáx center for treatment.

The first few chapters focused on epidemiological aspects of the syndrome and provided more solid data compared to previous reports that were mostly based on personal experiences of individual physicians<sup>4, 15-17</sup>. The results of the present thesis will aid in recognising the syndrome and allow for a standard inclusion of ACNES in the differential diagnosis of abdominal pain. In a hypothetical ideal situation, each physician is aware of the existence of the syndrome and recognises its characteristic symptoms 'at first sight'. If so, a long and frustrating (for both doctors and patients) diagnostic process is prevented whereas patients do get a tailored approach in an early phase of the illness. Apart from the enormous societal cost reduction as earlier discussed, a serious reduction in disease burden (both duration and severity of complaints) amongst ACNES patients

can be achieved. Currently, some patients are labelled with psychosomatic disorders when the pain is not recognised as due to ACNES. As a consequence, these patients feel frustrated and ignored leading to uncertainty and depression.

A regimen of consecutive abdominal wall injections followed by surgery in resistant cases is the method of choice as demonstrated in a cohort of 139 ACNES patients<sup>18</sup>. In the present thesis, the efficacy of the anterior neurectomy is unequivocally demonstrated by a randomised controlled trial and by studying the long-term results of the technique. A novel second invasive treatment step ('posterior neurectomy') is added to the existing surgical protocol leading to improved overall results. As a consequence, some 90% of ACNES patients can now be treated successfully. Most of these patients are able to return to normal daily activities instead of living the life of a chronic pain patient.

## References

1. Gallegos NC, Hobsley M. Abdominal wall pain: an alternative diagnosis. *The British journal of surgery*. 1990; 77: 1167-1170.
2. Hershfield NB. The abdominal wall. A frequently overlooked source of abdominal pain. *J Clin Gastroenterol*. 1992; 14: 199-202.
3. Srinivasan R, Greenbaum DS. Chronic abdominal wall pain: a frequently overlooked problem. Practical approach to diagnosis and management. *Am J Gastroenterol*. 2002; 97: 824-830.
4. Carnett J. Intercostal neuralgia as a cause of abdominal pain and tenderness. *Surg Gynecol Obstet*. 1926; 42: 8.
5. Ranger I, Mehta M, Pennington M. Abdominal wall pain due to nerve entrapment. *Practitioner*. 1971; 206: 791-792.
6. Applegate WV. Abdominal cutaneous nerve entrapment syndrome. *Surgery*. 1972; 71: 118-124.
7. Doouss TW, Boas RA. The abdominal cutaneous nerve entrapment syndrome. *N Z Med J*. 1975; 81: 473-475.
8. Thomson H, Francis DM. Abdominal-wall tenderness: A useful sign in the acute abdomen. *Lancet*. 1977; 2: 1053-1054.
9. Gallegos NC, Hobsley M. Recognition and treatment of abdominal wall pain. *J R Soc Med*. 1989; 82: 343-344.
10. Roumen RM, Scheltinga MR. [Abdominal intercostal neuralgia: a forgotten cause of abdominal pain]. *Ned Tijdschr Geneesk*. 2006; 150: 1909-1915.
11. Scheltinga MR, Boelens OB, Tjon ATWE, et al. Surgery for refractory anterior cutaneous nerve entrapment syndrome (ACNES) in children. *J Pediatr Surg*. 2011; 46: 699-703.
12. van Assen T, Brouns JAGM, Scheltinga MR, et al. Incidence of abdominal pain due to the anterior cutaneous nerve entrapment syndrome in an emergency department. *Scand J Trauma Resusc Emerg Med*. 2015.
13. Statistiek CBvd. Bevolkingsteller. [web page] [cited 2012; Available from: <http://www.cbs.nl/nl-nl/menu/themas/bevolking/cijfers/extra/bevolkingsteller.htm>.
14. Abdominal wall tenderness test: could Carnett cut costs? *Lancet*. 1991; 337: 1134.
15. Applegate WV. Abdominal Cutaneous Nerve Entrapment Syndrome (ACNES): A Commonly Overlooked Cause of Abdominal Pain. *Perm J*. 2002; 6: 20-27.

16. Hall PN, Lee AP. Rectus nerve entrapment causing abdominal pain. *The British journal of surgery*. 1988; 75: 917.
17. Thomson WH, Dawes RF, Carter SS. Abdominal wall tenderness: a useful sign in chronic abdominal pain. *The British journal of surgery*. 1991; 78: 223-225.
18. Boelens OB, Scheltinga MR, Houterman S, et al. Management of anterior cutaneous nerve entrapment syndrome in a cohort of 139 patients. *Annals of surgery*. 2011; 254: 1054-1058.